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PATENT COOPERATION TREATY

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REC'D 14 APR 2004

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

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(PCT Article 36 and Rule 70)

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| Applicant's or agent's file reference 22545PC/JM | FOR FURTHER ACTION See Form PCT/IPEA/416 | |
| International application No. PCT/SE2003/000074 | International filing date (day/month/year) 17.01.2003 | Priority date (day/month/year) 23.01.2002 |
| International Patent Classification (IPC) or national classification and IPC E05B 27/00, E05B 27/10, E05B 15/14 | | |
| Applicant Winloc AG et al | | |

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 3 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:

a. (*sent to the applicant and to the International Bureau*) a total of 5 sheets, as follows:

sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).

sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.

b. (*sent to the International Bureau only*) a total of (indicate type and number of electronic carrier(s))
_____, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

| | | |
|-------------------------------------|--------------|---|
| <input checked="" type="checkbox"/> | Box No. I | Basis of the report |
| <input type="checkbox"/> | Box No. II | Priority |
| <input type="checkbox"/> | Box No. III | Non-establishment of opinion with regard to novelty, inventive step and industrial applicability |
| <input type="checkbox"/> | Box No. IV | Lack of unity of invention |
| <input checked="" type="checkbox"/> | Box No. V | Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement |
| <input type="checkbox"/> | Box No. VI | Certain documents cited |
| <input type="checkbox"/> | Box No. VII | Certain defects in the international application |
| <input type="checkbox"/> | Box No. VIII | Certain observations on the international application |

| | |
|---|--|
| Date of submission of the demand 25.07.2003 | Date of completion of this report 06.04.2004 |
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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/SE2003/000074

Box No. I Basis of the report

1. With regard to the language, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

This report is based on a translation from the original language into the following language _____, which is the language of a translation furnished for the purposes of:

international search (under Rules 12.3 and 23.1(b))
 publication of the international application (under Rule 12.4)
 international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the elements of the international application, this report is based on (replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report):

the international application as originally filed/furnished
 the description:

pages 1 - 13 as originally filed/furnished
 pages* _____ received by this Authority on _____
 pages* _____ received by this Authority on _____

the claims:

pages _____ as originally filed/furnished
 pages* _____ as amended (together with any statement) under Article 19
 pages* 1 - 5 received by this Authority on 31.03.2004
 pages* _____ received by this Authority on _____

the drawings:

pages 1 - 6 as originally filed/furnished
 pages* _____ received by this Authority on _____
 pages* _____ received by this Authority on _____

a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

3. The amendments have resulted in the cancellation of:

the description, pages _____
 the claims, Nos. _____
 the drawings, sheets/figs _____
 the sequence listing (specify): _____
 any table(s) related to the sequence listing (specify): _____

4. This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

the description, pages _____
 the claims, Nos. _____
 the drawings, sheets/figs _____
 the sequence listing (specify): _____
 any table(s) related to the sequence listing (specify): _____

* If item 4 applies, some or all of those sheets may be marked "superseded."

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/SE2003/000074

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

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|-------------------------------|--------|-------------|-----|
| Novelty (N) | Claims | <u>1-18</u> | YES |
| | Claims | _____ | NO |
| Inventive step (IS) | Claims | <u>1-18</u> | YES |
| | Claims | _____ | NO |
| Industrial applicability (IA) | Claims | <u>1-18</u> | YES |
| | Claims | _____ | NO |

2. Citations and explanations (Rule 70.7)

The invention concerns a cylinder lock and key combination of the kind stated in the preamble of claim 1 and aims to provide a combination with a high number of code combinations and with high security against picking.

According to the invention, this is achieved by the features stated in the characterizing part of claim 1.

The invention also concerns a key blade as stated in claim 13 and a key blank as stated in claim 17.

From US 2155734 is known a combination corresponding to what is stated in the preamble of claim 1. In the known combination the contact portions of the locking tumbler assemblies are not adapted to be engaged by the same coded surface as in the invention.

From US 4760722 is known a cylinder lock and key combination with locking tumbler assemblies contacting a coded surface. The known lock is not of the kind stated in the preamble of claim 1.

A person skilled in the art should not, given the technical background above, arrive to a combination as stated in claim 1.

As the combination in claim 1 is new, is regarded to contain an inventive step, and also is industrially applicable, the patentability criteria are met.

The key blade and key blank in claims 13 and 17, which are dependant from claims 1-12, also meets these criteria.

CLAIMS

1. A cylinder lock (1) and key (2) combination, comprising
 - a cylinder shell (140),
 - a key plug (130) which is rotatably mounted in said shell,
 - a longitudinal key slot (100) extending along said key plug in parallel to the rotational axis thereof for receiving a key blade (200) having, at a side surface (201) thereof, a longitudinally extending groove (202) with a side wall (203) forming a longitudinally extending coded surface (203),
 - at least one locking tumbler assembly (110) having a body segment (113) with a contact portion (115) reaching into said key slot so as to engage with said coded surface (203) of a properly shaped key blade being inserted into said key slot,
 - 15 and
 - at least one cavity (120) located at a transversal side of said key slot (100) in said key plug (130), said cavity accommodating an associated one of said at least one tumbler assembly and guiding the latter for elevational movement therein,
 - said at least one locking tumbler assembly (110) comprising a pair of adjacent tumbler body segments (113, 114) accommodated in the same cavity, and
 - each tumbler body segment (113, 114) having an associated contact portion (115, 116) reaching into said key slot (100),
25 **characterised in that**
 - said adjacent tumbler body segments (113, 114) in said pair are elevationally movable independently of each other in said cavity so as to be individually displaced into respective elevational positions, and
 - said associated contact portions (115, 116) in said pair are axially separated in the longitudinal direction of the key plug such that these contact portions are located at a

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longitudinal distance from each other and will be positioned at elevationally specific and generally different levels when being engaged by said coded surface (203) upon insertion of said key blade (200) into said key slot (100)

5 - whereby the tumbler body segments (113, 114) in each pair are displaceable into a number of different positions relative to each other representing different codes.

10 2. A cylinder lock and key combination as defined in claim 1, wherein each segment in said pair of adjacent tumbler body segments (113, 114) is guided in a respective portion of said cavity (120).

15 3. A cylinder lock and key combination as defined in claim 2, wherein said pair of adjacent tumbler body segments (113, 114) have supplementary cross-sections, which together substantially correspond to the cross-section of said cavity (120).

20 4. A cylinder lock and key combination as defined in claim 3, wherein said adjacent tumbler body segments (113, 114) of said pair are partially defined by part-cylindrical surface portions being guided by wall portions defining said cavity (120).

25 5. A cylinder lock and key combination as defined in claim 3 or 4, wherein said adjacent tumbler body portions of said pair have mutually engaging surface portions (113a, 114a) being in sliding engagement with each other.

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6. A cylinder lock and key combination as defined in claim 5, wherein said mutually engaging surface portions (113a, 114a) are substantially planar.

5 7. A cylinder lock and key combination as defined in any one of the preceding claims, wherein said key plug (130) contains a row of cavities (120), at least one of which accommodating a pair of adjacent tumbler body segments (113, 114).

10 8. A cylinder lock and key combination as defined in any one of the preceding claims, wherein said key plug (130) includes at least one locking tumbler assembly (113, 114) on each transversal side of said key slot (100).

15 9. A cylinder lock and key combination as defined in any one of the preceding claims, wherein said pair of adjacent tumbler body segments (113, 114) cooperate with a side bar (150) being accommodated in a longitudinal recess (151) in said cylinder shell (140), said side bar (150) being adapted to normally lock the key plug against rotation in said shell and to be displaceable into a releasing position upon insertion of a properly coded key blade (200) into said key slot (100).

20 10. A cylinder lock and key combination as defined in any one of the preceding claims, wherein said contact portions of said tumbler body segments (113, 114) are constituted by outwardly projecting fingers (115, 116).

25 11. A cylinder lock and key combination as defined in claim 10, wherein said fingers (115, 116) are positively guided in said longitudinally extending groove (202) upon insertion of said key blade into said key slot.

12. A cylinder lock (1) having at least one pair of independently movable tumbler body segments (113, 114) accommodated in a cavity (120) in a key plug (130) forming part of a cylinder lock in a lock and key combination as defined in any one of the preceding claims.

13. A key blade (200) having, at a side surface (201) thereof, a longitudinally extending groove (202) with a side wall (203) forming a longitudinally extending coded surface (203) with at least one pair of neighbouring code surface portions (204, 205) located at elevationally specific and generally different levels for co-operation with the respective contact portions of a pair of adjacent tumbler body segments of a lock as defined in claim 12.

14. A key blade as defined in claim 13, wherein said longitudinally extending groove (202) positively guides said respective contact portions, constituted by outwardly projecting fingers, when the key blade is inserted into a lock.

15. A key blade as defined in claim 13 or 14, wherein said key blade (200) is symmetrical with longitudinal coded surfaces on each side thereof.

16. A key blade as defined in any one of claims 13-15, wherein said coded surface (203) comprises a longitudinal row of pairs (204, 205) of neighbouring code surface portions.

17. A key blank for producing a key blade as defined in any one of claims 13-16, said key blade having, at a side surface thereof, a longitudinally extending coded surface (203), said coded surface (203) being cut out from at least one material portion at the side of the key blade and having a pair of

AMENDMENT

neighbouring code surface portions (204, 205) for cooperation with the respective contact portions of a pair of adjacent tumbler segments in a lock as defined in claim 12.

5 18. A key blank as defined in claim 17, wherein the coded surface (203) is undercut.

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